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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/798,643	03/10/2004	Eric A. Jacobsen	P18403	6694

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EXAMINER	
CHAUDRY, MUJTABA M	
ART UNIT	PAPER NUMBER
2133	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/08/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/798,643	JACOBSEN, ERIC A.	
	Examiner	Art Unit	
	Mujtaba K. Chaudry	2133	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8 and 11-24* is/are rejected.

7)☒ Claim(s) *9,10 and 25-27* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 March 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claims 1-27 are presented for examination.

Oath/Declaration

The Oath filed March 10, 2004 complies with all the requirements set forth in MPEP 602 and therefore is accepted.

Drawings

The drawings submitted Mach 10, 2004 are objected to because:

- Figure 6 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Appropriate correction is requested.

Specification

The specification filed March 10, 2004 is accepted.

Claim Objections

Claim 11 is objected to because of the following informalities:

- The claim lacks a preamble. Applicant is suggested to rewrite claim 11 in proper format clearly discerning the preamble from the body of the claim as is done in other claims.
- Applicant is also suggested to use semicolons (;) to separate limitations as is done in other claims.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 11 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. See MPEP 2111.04.

In lines 3, the claim recites, "...using a second decoding algorithm to **potentially** flip a logic state of one or more bits."

- The term potentially means *possibly but not yet actually*. Therefore it is not clear if the claim performs this step.

Appropriate correction and is requested. To the extent possible, the Examiner will make interpretations in accordance with MPEP 2111.

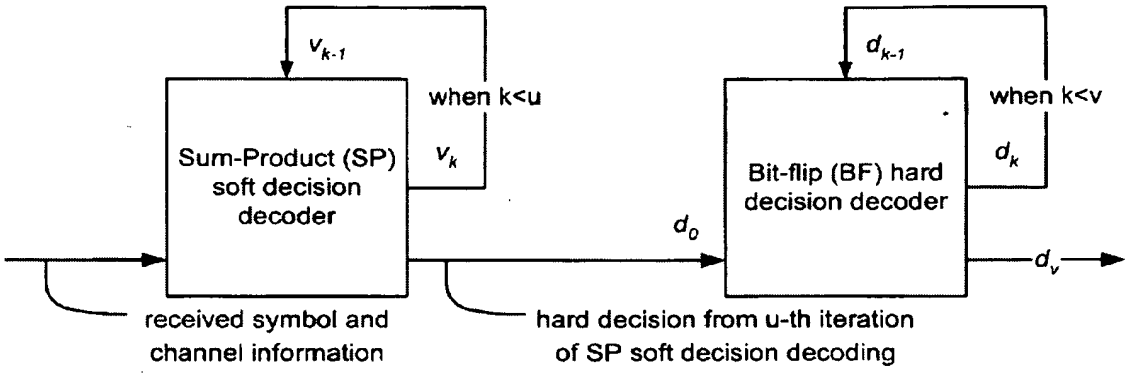
Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-8 and 11-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Shen et al. (USPAP 2004/0148561).

As per claim 1, Shen et al. (herein after: Shen) teaches a decoding method (i.e., paragraph 0011, lines 1-3) comprising: decoding information received at a network device (i.e., Figure 1, satellite receiver with decoder) by applying a first algorithm iteratively until a stopping criterion is reached (i.e., Figure 13B, SP soft-decision decoder and paragraph 0143); and further decoding the information using a second algorithm different than the first algorithm (i.e., Figure 13B, BF hard decision decoder and paragraph 0143). The Examiner would like to point out that the first decoding is processed for all k<u, which is the stopping criteria for the first SP decoder and the second decoding is processed for all k<v, which is the stopping criteria for the second BF decoder (i.e., paragraph 0143). See Figure 13B:



combination Sum-Product (SP) soft decision decoding and Bit-Flip (BF) hard decision decoding

Fig. 13B

As per claim 2, Shen teaches (i.e., paragraph 0124, lines 1-4) the information comprises a block-encoded codeword.

As per claim 3, Shen teaches (i.e., paragraph 0096, lines 3-7) the block encoded codeword comprises a low-density parity-check codeword.

As per claim 4, Shen teaches (i.e., Figure 3C, below) the network device includes a radio frequency (RF) transceiver. The Examiner would like to point out that the communication is to/from a cellular tower, which operates at radio frequencies and therefore the transceivers are RF. By definition, RF refers to that portion of the electromagnetic spectrum in which electromagnetic waves can be generated by alternating current fed to an antenna.

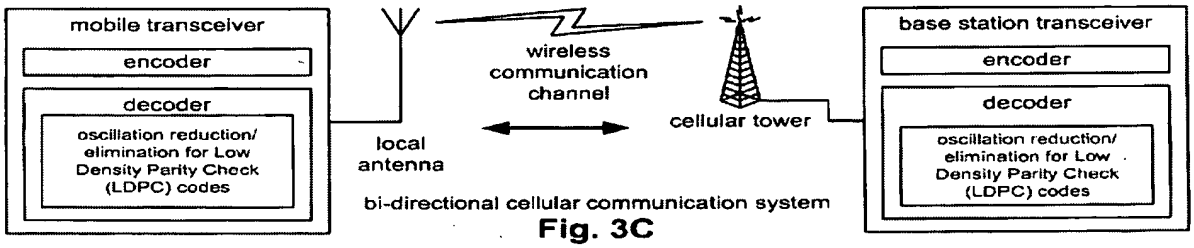
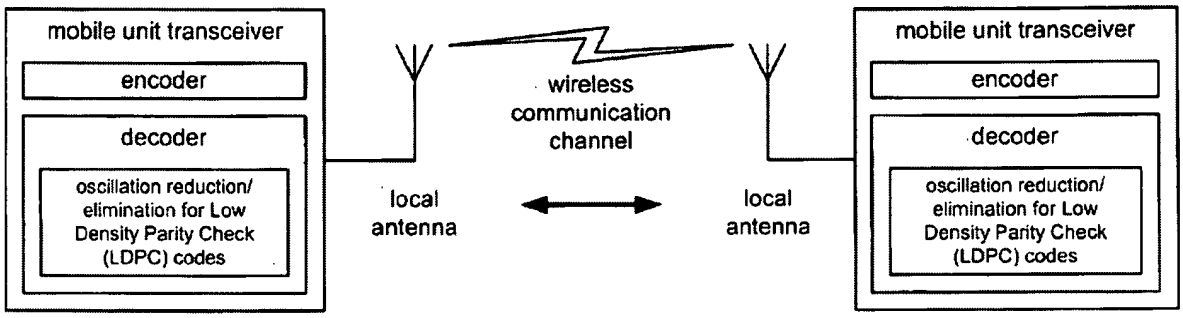


Fig. 3C

As per claim 5, Shen teaches (i.e., Figure 5B, below) the RF transceiver comprises a wireless local area network (WLAN) transceiver. The Examiner would like to point out that a

WLAN, by definition, is a wireless local area network, which is the linking of two or more devices without using wires. The moblie unit transceivers shown in Figure 5B are part of a local area network that are connected wirelessly.



bi-directional point-to-point radio communication system

Fig. 5B

As per claim 6, Shen teaches (i.e., Figure 5B and paragraphs 0065 and 0087) the network device to comprises Ethernet device. The Examiner would like to point out that Shen teaches communication via computers (paragraph 0065) and in Figure 5B teaches communication between local networks which are supported by Ethernet communication (paragraph 0087).

As per claim 7, Shen teaches (i.e., paragraph 0143, lines 11-13) the stopping criteria to comprise a number of decoding iterations.

As per claim 8, Shen teaches (i.e., paragraph 0143, lines 11-13) the stopping criteria to comprise an elapsed time since each iteration takes time to perform. The Examiner would like to point out that each iteration performed on decoding data requires time and the number of iterations will have an elapsed time (i.e., paragraph 0142).

As per claim 11, Shen teaches a device configured to decode received information (i.e., Figure 1, satellite receiver with decoder) using a first iterative decoding algorithm (i.e., Figure 13B, SP soft decision decoder and paragraph 0143) to converge a probability regarding bit logic

states and after a last iteration (i.e., paragraph 0118, lines 1-5), using a second decoding algorithm (i.e., Figure 13B, (BF) bit-flip hard decision decoder and paragraph 0143) to potentially flip a logic state of one or more bits.

As per claim 12, Shen teaches (i.e., paragraph 0096, lines 3-7) the block encoded codeword comprises a low-density parity-check codeword.

As per claim 13, Shen teaches (i.e., paragraph 0065) to comprise a user station. The Examiner would like to point out that the specification of the present application (Specification: paragraph 0033) defines user station to include a laptop computer and Shen teaches (paragraph 0065) a mobile computer, which is equivalent to a laptop computer. Therefore Shen teaches a user station.

As per claim 14, Shen teaches (i.e., paragraph 0065) to comprise network access station. The Examiner would like to point out that the specification of the present application (Specification: paragraph 0034) defines network access station to include a transceiver and Shen teaches (paragraph 0065) a mobile transceiver. Therefore Shen teaches a network access station.

As per claim 15, Shen teaches (i.e., paragraph 0065) to comprise network interface card. The Examiner would like to point out that, by definition, a network card is a piece of computer hardware designed to allow computers to communicate over a computer network. Shen teaches a mobile computer having transceiver functionality (i.e., paragraph 0065, lines 8-11) therefore the computer has to have a network interface card in order to communicate over a network.

As per claim 16, Shen teaches (i.e., Figure 1 and paragraph 0065) to comprise an orthogonal frequency division multiplexing (OFDM) enabled transceiver. The Examiner would like to point out that, by definition, in OFDM the bit stream to be transmitted is split into several

parallel bit streams, typically dozens to thousands. The available frequency spectrum is divided into several sub-channels, and each low-rate bit stream is transmitted over one sub-channel by modulating a sub-carrier using a standard modulation scheme, for example PSK, QAM, etc. The sub-carrier frequencies are chosen so that the modulated data streams are orthogonal to each other, meaning that cross-talk between the sub-channels is eliminated. This orthogonality occurs when sub-carriers are equally spaced by the symbol rate of a sub-carrier. Shen teaches (i.e., Figure 1 and paragraph 0047) the satellite communication system to comprise more than one receivers and therefore the transmitted data is split into several parallel bits streams and are modulated using OFDM. Shen further details the satellite receiver (i.e., Figure 8 and paragraphs 0092-0095) and teaches each satellite receiver to have an advanced modulation scheme, which has to operate on OFDM.

As per claim 17, Shen teaches (i.e., Figure 3B) a receiver (analogous to mobile receiver); a digital processing portion (analogous to decoding unit coupled to the receiver) coupled to the receiver; and an antenna coupled to the receiver (analogous to local antenna coupled to the mobile receiver). The Examiner would like to point out that the decoder is analogous to the digital processing portion since a decoder performs processing on digital data.

As per claim 18, Shen teaches a communication system (i.e., Figure 1, satellite communication system) comprising: a radio frequency transceiver (i.e., Figure 3B, i.e., mobile transceiver); and a decoder (i.e., Figure 3B, decoder in mobile transceiver) coupled to the RF transceiver and adapted to decode received information using a first iterative decoding process (i.e., Figure 13B, SP soft decision decoder) and to further decode the received information using a second decoding process (i.e., Figure 13B, BF hard decision decoder) different than the first

iterative decoding process. The Examiner would like to point out that the communication is to/from a cellular tower, which operates at radio frequencies and therefore the transceivers are RF. By definition, RF refers to that portion of the electromagnetic spectrum in which electromagnetic waves can be generated by alternating current fed to an antenna.

As per claim 19, Shen teaches (i.e., Figure 5B, above) the RF transceiver comprises a wireless local area network (WLAN) transceiver. The Examiner would like to point out that a WLAN, by definition, is a wireless local area network, which is the linking of two or more devices without using wires. The moblie unit transceivers shown in Figure 5B are part of a local area network that are connected wirelessly.

As per claim 20, Shen teaches (i.e., Figure 3B, mobile transceiver with local antenna) one or more antennas coupled to the RF transceiver. The Examiner would like to point out that the communication is to/from a cellular tower, which operates at radio frequencies and therefore the transceivers are RF. By definition, RF refers to that portion of the electromagnetic spectrum in which electromagnetic waves can be generated by alternating current fed to an antenna.

As per claim 21, Shen teaches (i.e., Figure 3B and paragraph 0065, line 9) a cellular telephone.

As per claim 22, Shen teaches (i.e., Figure 3B and paragraph 0065, line 10) a personal computer.

As per claim 23, Shen teaches (i.e., Figure 3B, base station transceiver and paragraph 0066) a base station.

As per claim 24, Shen teaches a method for decoding information (i.e., Figure 1 and paragraph 0143) comprising: receiving coded information (i.e., Figure 1, satellite transmitter

with encoder that transmits coded signal to satellite receiver); iteratively decoding the received information (i.e., Figure 13B and paragraph 0143, lines 3-19); and after a last iteration, flipping one or more bits of the decoded information having a low probability of a certain logic state (i.e., paragraphs 0132-0137). The Examiner would like to point out that the bit-flipping process is described in detail, which includes a step of syndrome calculation (i.e., paragraph 133). The process of syndrome calculation involves the presence of errors that are corrected by bit flipping and is analogous to the limitation of "low probability of a certain logic state" because, for example, if the syndrome is 1 for a particular parity check equation it is the same as saying that there is a low probability of that logic state and will be flipped. In other words, bit flipping for a data with syndrome 1 is equivalent with the bit flipping for data with low probability of certain logic state.

Allowable Subject Matter

Claims 9, 10 and 25-27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Below are Examiner's reasons for indication of allowable subject matter:

Claims 9, 10 and 25-27 recite limitations which are believed to be Applicant's novelty to the art of iterative decoding. These limitations are not taught by the prior art. Specifically, claim 9 and claim 25, for example, recite the limitation of determining check nodes having the lowest metrics in the iterative decoding process is not taught by the prior art nor would it have been obvious to one of ordinary skill in the art without improper hindsight.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Additional pertinent prior arts are included herein for Applicant's review. For example:

Anders Nystom et al. (USPN 6189123) teach an apparatus and method that facilitates the efficient utilization of a channel extending between a sending and a receiving station of a digital communication system. A block of symbols to be transmitted by the sending to the receiving station is encoded utilizing a parallel-concatenated encoding technique. Selected encoded versions, or portions thereof, are transmitted by the sending station to the receiving station. The receiving station decodes the signals received thereat. If recovery of the informational content of the block of symbols cannot be effectuated, a request is made to transmit additional encoded versions, or portions thereof, of the block of symbols.

Nazari et al. (USPN 6888897) teach a transmitter is provided for transmitting data to a communication channel and a receiver receives the data from the communication channel. The transmitter comprises an encoder to encode data and a linear block encoder to encode data encoded by the encoder. The receiver comprises a soft channel decoder to decode the data, and a soft linear block code decoder to decode data decoded by the soft channel decoder. In the first iteration, the soft channel decoder decodes data received by the receiver. In succeeding iterations, the soft channel decoder decodes the data received by the receiver and utilizes information from the soft linear block decoder from an immediate preceding iteration. A decision circuit selects an output of the soft linear block decoder if an evaluated criterion is less

than a threshold, or an output of the soft channel decoder if the evaluated criterion is greater than the threshold. A decoder decodes an output of the threshold check circuit.

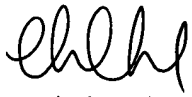
Shen et al. (USPN 6518892) teach a method and apparatus for determining the stopping point of an iterative decoding process. In one embodiment the estimated values of an iteration of an iterative decoder are provided to a signature circuit. If the signature does not differ from the previous signature developed from a prior iteration, or the signature developed from an iteration prior to the previous iteration, the decoding stops. The variance may also be tested and compared to a threshold as a criterion to stop the iterative decoding.

Yedida et al. (USPN 7103825) a method decodes a received word for a binary linear block code based on a finite geometry. First, a parity check matrix representation of the code is defined. The received word is stored in a channel register. An active register represents a current state of the decoder. Each element in the active register can take three states, representing the two possible states of the corresponding bit in the word, and a third state representing uncertainty. Votes from parity checks to elements of the active register are determined from parity checks in the matrix, and the current state of the active register. A recommendation and strength of recommendation for each element in the active register is determined from the votes. The elements in the active register are then updated by comparing the recommendation and strength of recommendation with two thresholds, and the state of the corresponding bit in the received word. When termination conditions are satisfied, the decoder outputs the state of the active register. If the decoder outputs a state of the active register that does not correspond to a codeword, a new representation for the code using a parity check matrix with substantially more rows is chosen, and the decoding cycle is restarted.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mujtaba K. Chaudry whose telephone number is 571-272-3817. The examiner can normally be reached on Mon-Thur 9-7:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert DeCady can be reached on 571-272-3819. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Mujtaba Chaudry
Art Unit 2133
December 27, 2006